

WHAT IS CLAIMED IS:

1. A system for managing broadband IP services in a layer two broadcast network comprising:

- 5 at least one intermediate system receiving traffic from outside and forwarding to at least one end system and also forwarding the response traffic from the at least one end system to the outside, wherein the at least one intermediate system forwards service request packet to one of the at least one available end system that the intermediate system learns from the service advertisements by the at least one end system;
- 10 at least one end system advertising and providing service information on the layer two network; wherein if one of the at least one end system determines to instruct the at least one intermediate system to forward certain traffic from certain source to another end system, the at least one end system can advertise the flow information to the other intermediate system, and wherein service information is advertised by each of the at least one end system on the layer two network, and the at least one intermediate system always forwards the packet based on the flow that is advertised by the at least one end system, and each of the at least one end system can be added on the fly to share the load and gracefully shut down on the fly without interrupting other systems on the network and affecting the service; and
- 15 at least one supervisor system handling the registration from all the systems on the layer two network, responding the request of any new system that looks for the server list for a particular service on this network, running as an Assigned Numbers Authority server for this layer two network, and running as a management agent that manages all the systems registered to the at least one supervisor system.
- 20 2. A system for managing broadband IP services in a layer two broadcast network comprising:
- 25 at least one intermediate system listening to service information advertised by at least one end system and relayed by at least one supervisor system, storing the at least one end system and the at least one supervisor system into server table of the at least one intermediate system, storing the advertisement in the flow table in addition to the server table,

forwarding the newly request traffic to one of the at least one end system looked up from this server table, forwarding the packet based on the flow that is advertised by the at least one end system, and receiving traffic from outside and forwarding to at least one end system and also forwarding the response traffic from the at least one end system to the outside,

- 5 wherein the at least one intermediate system forwards service request packet to one of the at least one available end system that the intermediate system learns from the service advertisements by the at least one end system, and if the at least one end system determines to instruct the at least one intermediate system to forward certain traffic from certain source to the at least one end system, the at least one end system can advertise the flow information to the at least one intermediate system;

at least one end system advertising and providing service information, which contains the operations of registration of services by the at least one end system, the service congestion status and server list for a particular service, on the layer two network, wherein if one of the at least one end system determines to instruct another one of the at least one intermediate system to forward certain traffic from certain source to another one of the at least one end system, the at least one end system can advertise the flow information to another one of the at least one intermediate system, and wherein the service information is advertised by each of the at least one end system on the layer two network, and the at least one intermediate system always forwards the packet based on the flow that is advertised by the at least one end system, and each of the at least one end system can be added on the fly to share the load and gracefully shut down on the fly without interrupting other systems on the network and affecting the service; and

at least one supervisor system handling the registration from all the systems on this layer two network, responding the request of any new system that looks for the server list for a particular service on this network, running as an Assigned Numbers Authority server for this layer two network, and running as a management agent that manages all the systems registered to the at least one supervisor system.

3. The system of claim 1, or claim 2, wherein the flow is an TCP connection or any packets that are specified by the pattern matching rules, for the packets that don't match any advertised flow, and the service table is adapted to be looked up and one of the at least one

end system picked up based on the response metric and other policies, and both service and flow classification are specified in pattern matching rules to allow faster execution by the pattern-matching network processors.

4. The system of claim 1 or 2, wherein the flow advertisement contains the flow attributes

5 that could contain the quality of service requirements to support real time application, and the flow advertisement contains also the flow attribute that could insert or delete label or tag or modify the type of service and priority within the packet header to support multiple protocol label switching, DiffServ and 802.1p priority.

5. The system of claim 1 or 2, wherein the Assigned Numbers Authority protocol manages

10 all the numbers that are shared by these servers that work together as one logical IP entity on this network, and, the service information, flow advertisement and Assigned Numbers Authority protocol together also allows the at least one end system load-balanced serve a service like one logical end system.

6. The system of claim 1 or 2, wherein the at least one intermediate system is on IP router.

15 7. The system of claim 1 or 2, wherein the at least one intermediate system is a switch-type device.

8. The system of claim 1 or 2, wherein the at least one end system is an HTTP server.

9. The system of claim 1 or 2, wherein the at least one end system is an FTP server.

10. The system of claim 1 or 2, wherein the at least one end system is a firewall proxy  
20 server.

11. The system of claim 1 or 2, wherein the at least one end system is an IPSEC tunneling server.

12. The system of claim 1 or 2, wherein the at least one end system is an Network Address Translation server.

25 13. A method for managing broadband IP services in a layer two broadcast network including at least one end system, at least one intermediate system, and at least one supervisor system, comprising the step of:

directing a packet by the at least one intermediate system to the at least one end system based on service registration and server congestion advertisement message sent by the at

30 least one end system;

directing a flow to the at least one end system which advertises the flow routing information to the at least one intermediate system;

14. A method for managing broadband IP services in a layer two broadcast network including at least one end system, at least one intermediate system, and at least one supervisor system, comprising the steps of:

advertising service information by the at least one end system;

relaying the service information by the at least one supervisor system;

listening to the service information by the at least one intermediate system;

storing the at least one end system and the at least one supervisor system into server table of the at least one intermediate system by the at least one intermediate system;

storing the advertisement in the flow table in addition to the server table by the at least one intermediate system;

forwarding the newly request traffic to one of the at least one end system looked up from this server table by the at least one intermediate system;

forwarding the packet based on the flow that is advertised by the at least one end system by the at least one intermediate system; and

receiving traffic from outside and forwarding to at least one end system and also forwarding the response traffic from the at least one end system to the outside by the at least one intermediate system.

15. The method of claim 13 or 14, wherein the service and flow classification are specified in pattern matching rules to allow faster execution by the pattern-matching network processors.

16. The method of claim 13 or 14, wherein the service information contains the operations of registration of services by servers, the service congestion status and server list for a particular service, the flow advertisement contains the flow attributes that could contain the quality of service requirements to support real time application, and the flow advertisement contains also the flow attribute that could insert or delete label or tag or modify the type of service and priority within the packet header to support multiple protocol label switching, DiffServ and 802.1p priority.